



White rectangular structures (birdcages) on the Gig Harbor pier serve as construction forms for the tower lifts (or pours). These birdcages were set on the south Gig Harbor tower leg in August.



Fledgling towers make their way skyward in the fall of 2004.



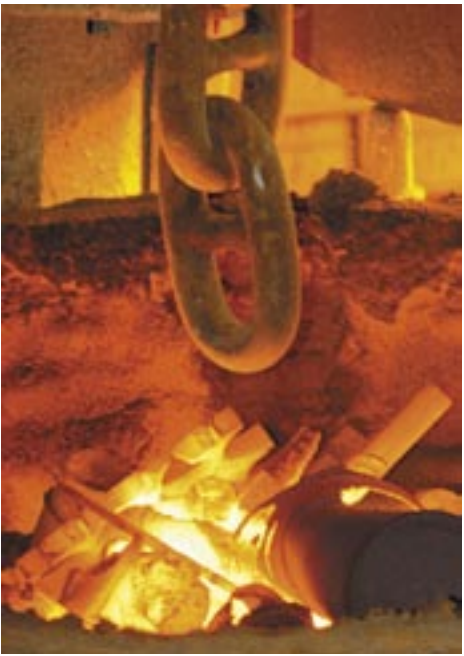
As of January 2005, both the Gig Harbor and Tacoma were approaching 250 feet of their ultimate 510-foot height



By the end of May 2005, the Tacoma and Gig Harbor towers had grown 495 feet (plus) tall. The towers reach final elevation at 510-feet above sea level.



The crane operator, who delivers buckets of concrete from pier top to tower, does not need to climb a stairwell to reach his office in the sky. Instead, he takes an elevator (not in view here) to the crane's cab.



From water to sky – several 205-lb. anchor chain links that held caissons in place during construction are melted down to create molten steel that will become saddles on the new bridge towers.



photos courtesy of Tacoma Narrows Constructors

May 2005

New Bridge Vital Statistics

Bridge Length:
5,400 ft. (overall)

Main Span:
2,800 ft. (tower to tower)

Deck Panels:
46 sections, 120 ft. by 78 ft. (each)

Tower Height:
510 ft. tall
8,500 cubic yds. concrete
(per tower)

**Tower Foundations
or Caissons (each):**
– 1.7 million lbs. steel (total)
– 850,000 lbs. steel
(base or cutting edge)
– 6 million lbs. rebar
– 30,000 cubic yards concrete

Anchorage (each):
– 20,600 cubic yards concrete
– 900,000 lbs. rebar
– 90 million lbs. (total weight)

Cable Diameter: 20.5 inches

Steel Bundles per Cable: 19

Wires per Bundle: 464

Structural Steel:
35.5 million lbs.
(excludes weight of cables)
49.7 million lbs.
(all steel excluding towers)

The New Tacoma Narrows Bridge

New Parallel Bridge Completed: Early 2007
1950 Bridge (Retrofit) Completed: Early 2008

In the three years since the Washington State Department of Transportation began the Tacoma Narrows Bridge Project, the overall project is more than halfway complete. The \$849 million project consists of constructing a parallel suspension bridge, improving 2.4 miles of roadway on State Route 16, and improving the existing bridge. The new bridge will open to traffic in spring 2007 with the entire project finishing in early 2008.

Not only is the new Narrows Bridge the world's largest suspension bridge under construction, it is the longest to be built in the United States since the Verrazano Narrows Bridge in New York was opened in 1964.

Safety and reliability come first

Constructing what will be the third bridge to span the Tacoma Narrows (Galloping Gertie was the first) will improve the safety of motorists and freight carriers who travel on State Route 16.

When the second bridge was built in 1950, it was intended to handle 60,000 vehicles a day, not the 90,000 that travel the roadway today. Engineers estimate 120,000 vehicles will use the bridges by 2020. The new bridge project will improve the ability of people and freight to move safely, reliably and conveniently during any hour of the day.

At a Glance

Project Scope:
3.4 miles of roadway (including bridge)

Boundaries:
Jackson Avenue NW (Tacoma) to just west of new 36th Street NW (Gig Harbor)

Start Date:
Broke Ground October 2002

New Bridge Completed: Spring 2007

1950 Bridge Retrofit Completed: Early 2008

Owner:
Washington State Department of Transportation

Contractor: Tacoma Narrows Constructors
(Joint venture: Bechtel and Kiewit)

Cost of Project: \$849 million

Part Paid By Tolls: \$800 million

Initial Toll: \$3 roundtrip (per vehicle)
collected eastbound direction only

WSDOT Tacoma Narrows Bridge Office
3214 50th Street Court NW, Suite 302
Gig Harbor, WA 98335
Phone: 1-877-7NARROW or (253) 534-4640

Filiz Satir, Community Outreach (253) 534-4670
Claudia Cornish, Media Relations (253) 534-4646

For more information about the bridge project, visit the TNB web site: www.tacomanarrowsbridge.com

Tacoma Narrows Constructors (bridge builder)
3212 50th Street Court NW, Suite 100
Gig Harbor, WA 98335
Phone: (253) 853-9500

Erin Babbo, Public Affairs (253) 853-9777

BRIDGE TIMELINE

2002

- September:** WSDOT and Tacoma Narrows Constructors officially started design work of Narrows Bridge
- October:** Groundbreaking ceremony held Oct. 5

2003

- January:** Roadway construction begins
- March:** First cutting edge launched from Seattle for delivery to Port of Tacoma
- April:** Second cutting edge launched from Seattle for delivery to Port of Tacoma
- July/August:** Caissons (bridge foundations) towed into Narrows
- September:** New 24th St NW underpass opens
- October:** Westbound SR 16 ramps at 24th St NW open to traffic; East anchorage fully excavated and related concrete pours begin
- December:** Gig Harbor caisson reaches seabed: 1st Touch Down

2004

- January:** Tacoma caisson reaches seabed: 2nd Touch Down; West anchorage fully excavated
- February:** Deck and suspension cable fabrication begin in Korea; West anchorage concrete pours begin
- March:** Air domes cut out of both caissons, and dredging begins
- May/June:** Caissons reach full height and are sealed
- July:** Tower construction begins

2005

- June:** Tower construction and anchorages to be completed
- August:** Suspension system underway with cable spinning

2006

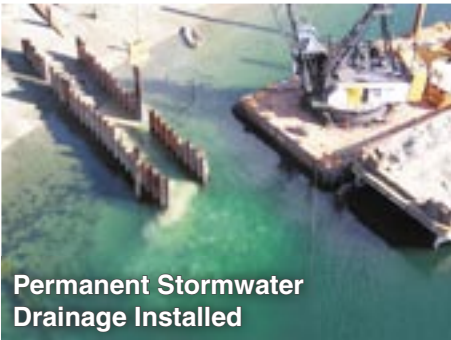
- February:** Deck construction begins

2007

New bridge complete in spring; opens to traffic in temporary lane configuration

2008

Existing bridge retrofit complete; eastbound traffic on new bridge and westbound traffic on old bridge



Permanent Stormwater Drainage Installed



Gig Harbor SR 16 Improvements

Parallel bridges mean new traffic configuration

A suspension bridge is the bridge style structural engineers use to cross the longest spans. The existing 1950 bridge, a mile in length, is the fifth longest bridge in the United States. The new parallel bridge will be just as long and its foundations are a mere 60 feet south of the current bridge's foundations.

In 2007, eastbound and some westbound traffic will travel across the new bridge while the existing bridge undergoes a seismic retrofit that will improve its performance during an earthquake.

Once all construction is finished in the spring of 2008, each bridge will be configured to provide two general-purpose and one high occupancy vehicle (HOV) lane. The 1950 bridge (westbound traffic) will have three 12-foot lanes with 2-foot inside and 8-foot outside shoulders. The new bridge (eastbound traffic) will have three 12-foot lanes and 10-foot inside and outside shoulders, and a 10-foot separated bike path.

The two bridges will function in tandem with other State Route 16 corridor improvements* and, ultimately, ease traffic congestion across the Narrows.

**Between spring 2004 and 2007 major roadway improvements along SR 16 will be built between Tacoma's Union Avenue and Olympic Drive in Gig Harbor. These improvements include adding eastbound and westbound HOV lanes.*



East Anchorage and Tower Crane by Moonlight.

Getting the project done on time and within budget

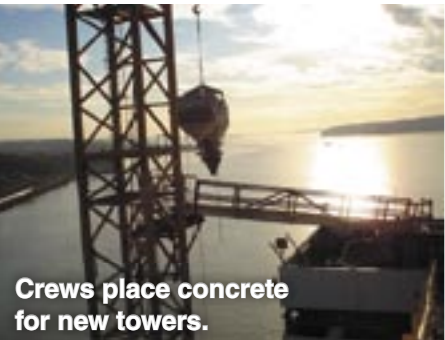
No matter what the project, the Washington State Department of Transportation makes every effort to complete construction projects on time and on budget. The Narrows Bridge Project features a new contract method in Washington state called "design build." Under this type of contract, project design and construction take place simultaneously under one contract. The project's contractor, Tacoma Narrows Constructors, is moving at an amazingly fast pace. Because construction is concurrent with design, the timeline for the TNB project is estimated to be two years shorter than if the state had pursued a typical contract. Under a typical "design-bid-build" contract, bridge design would be near complete. Construction would not have begun.

Transportation officials have developed three measures to evaluate the efficiency of design-build contracting for the TNB project. They include:

- Schedule comparisons between traditional contract methods and the design-build method
- Project management and oversight of budgets (percentage of total capital costs)
- Contingency budget oversight (as a percent of total capital costs)



Tower Construction



Crews place concrete for new towers.

Right on schedule

In the first three years of the design-build project, Tacoma Narrows Constructors reached several milestones. Structural engineers finished all aspects of bridge design; crews towed out and constructed the bridge foundations (caissons) in the summer of 2003; later that year and in early 2004, engineers and technicians - with the help of a global positioning system and laser beams - positioned the caissons on the seabed. Shortly thereafter, the foundations were embedded about 65 feet below the Narrows mudline. Tower construction began in earnest in August 2004, and reached final elevation, or 510 feet above sea level, in late May 2005. On land, bridge builders made swift progress, too: By January 2004, the anchorages had been fully excavated, and a year later, completely filled in with concrete. In just three years, an impressive amount of roadwork - a highway overpass, new ramps, realigned local roads - are done. The toll plaza and administration buildings, started a year ago, are nearly completed. Expect many more bridge hallmarks in 2005.

Project cost summary

The capital cost for the Tacoma Narrows Bridge project is \$760.4 million. The chart below illustrates project budget and expenditures through the end of 2004. Financing costs and reserve debt service (\$88 million) associated with construction, brings the total projected cost of the project to \$849 million.

Expenditures as of April 2005.

Project Cost Summary (in Millions)	Budgeted	Expended
Design-Build Contract	615.0	480.5
Toll System Contract	9.2	2.4
WSDOT Oversight	41.0	14.8
Contingencies Expended	51.5	5.3
Contingencies Committed	3.2	0.0
Phase I Dev. Cost (UIW)	40.5	39.8
Total	760.4	542.8
Total Expended/Total Cost	71.3%	



A view of the new towers

BRIDGING OUR PAST TO THE PRESENT



In 1940, when the first Narrows Bridge opened to traffic it earned the distinction of being the world's third largest suspension bridge. More than two-dozen engineers and 200 laborers made up the team of builders. It took 19 months to complete the job with workers putting in around-the-clock shifts.

Those of us who live in the Pacific Northwest – maybe anyone on planet earth – know the tale of the first bridge, "Gallopig Gertie." It stood for four months with its deck flexing and rolling before it tore apart in a 40-mile-per-hour windstorm, and collapsed into Puget Sound.

Even today, the roller-coaster gyrations of Gertie remain one of the most mesmerizing images in Washington state history. But the story of the Tacoma Narrows goes far beyond the infamy of a fallen bridge. It is the story of the Narrows as home to indigenous people: Native Americans who lived on its shores 9,000 years ago. It's a chronicle of bridge-building science, and how that first bridge contributed immensely to advances in structural engineering and the evolution of the suspension bridge. Bridges are machines with massive parts – foundations, anchorages, towers – that together with the principles of physics allow them to stay suspended.

The Narrows Bridge also is a story about art and architecture. The Art Deco styles of the 1920s and 1930s greatly influenced building design, including bridge architecture. The sleek, symmetrical and geometric lines of this structure make the suspension bridge appear delicate. But compared to other bridge types (beam and arch), it is the strongest. Importantly, bridges connect people and places and ideas. The Tacoma Narrows is a tale about people: commuters, students, and the recreation-minded who travel the span daily; the men who built the first and second bridges; and, the team of designers, engineers and craftspeople now tasked with building the third bridge.

For more on the history of the Tacoma Narrows and the science of bridge-building visit the web site: www.tacomanarrowsbridge.com and click on [History & More](#).